

Appl. No. 10/510,417
Amdt. Dated June 9, 2008
Reply to Office Action of March 7, 2008

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Amendments to the Claims:

This listing will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently amended): A piston pump for a blood pressure measuring device comprising:

a cylindrical cylinder having a cylinder head;

a piston reciprocating inside the cylinder;

a suction port through which gas sucked into a pump chamber defined by the cylinder and the piston passes; and

an exhaust port through which the gas discharged from the pump chamber passes;

wherein the piston pump sucks the gas through the suction port and discharges the gas through the exhaust port as the volume of the pump chamber is changed by reciprocating motion of the piston;

wherein the suction port is arranged at a top of the piston with a suction valve, which opens as the volume of the pump chamber is increased; and

wherein the exhaust port is arranged at a top of the cylinder with an exhaust valve, which opens when the volume of the pump chamber is decreases; and

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wherein the cylinder and the cylinder head are bonded together by gluing, welding, and/or adhesion in an air tight manner.

Claim 2 (Currently amended): The piston pump according to claim 1, wherein the suction valve is arranged at a top face of the piston on a side of the pump chamber.

Claim 3 (Currently amended): The piston pump according to claim 1, wherein the exhaust valve is umbrella-shaped and arranged at a top face of the top of the cylinder on an opposite side to outside the pump chamber ~~of the top of the cylinder.~~

Claim 4 (Currently amended): The piston pump according to claim 1,
wherein the piston has an opening communicating with the suction port ~~on an opposite side to the pump chamber,~~

wherein the opening is arranged outside the pump chamber so as to allow air sucked through the suction port into the pump chamber to pass and a plenum capable of storing the air to communicate with the opening; and

wherein the plenum is encompassed by an enclosure having at least one plenum suction port; and

wherein the enclosure is in a housing having a base portion fixed to the cylinder such that the base portion holds a motor.

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Claim 5 (Currently amended): A piston pump including:

a cylindrical cylinder having a top portion;

a piston reciprocating inside the cylinder;

a suction port through which gas sucked into a pump chamber defined on a side of by a wall of the top portion of the cylinder by, a side wall of the cylinder and a top face of the piston passes; and

an exhaust port through which the gas discharged from the pump chamber passes;

wherein the piston pump sucks the gas from the suction port and discharges the gas through the exhaust port as a volume of the pump chamber is changed by reciprocating motion of the piston;

wherein the suction port is arranged at the top portion of the cylinder with a suction valve, which opens when the volume of the pump chamber is increased; and the exhaust port is arranged at the piston with an exhaust valve, which is umbrella-shaped and is arranged outside the pump chamber and opens when the volume of the pump chamber is decreased.

Claim 6 (Currently amended): The piston pump according to claim 5, wherein the suction valve is umbrella-shaped and arranged on a side of inside the pump chamber.

Claim 7 (Currently amended): The piston pump according to claim 1,

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wherein the piston engages with a coupling member in such a manner that the coupling member is capable of turning in a circumferential direction thereof, and

wherein the coupling member is ring-shaped and connected to a connecting member driven such that the engaged piston is reciprocated inside the cylinder.

Claim 8 (Original): The piston pump according to claim 7,

wherein the piston comprises therein a recess portion formed continuously in the circumferential direction of the piston and engaged with the coupling member, the recess portion including at least a part of a first predetermined spherical surface;

wherein the coupling member has a projection portion formed continuously in the circumferential direction such that the projection portion corresponds to the recess portion, the projection portion including at least a part of a predetermined second spherical surface to engage with the recess such that the projection portion is capable of turning in the circumferential direction and in an axial direction; and

wherein the piston reciprocates when the projection portion and the recess portion engage with each other so as to transmit driving force from the connecting member to the piston.

Claim 9 (Previously presented): The piston pump according to claim 1, wherein at least a portion of the piston sliding on an inner wall of the cylinder is composed of a self-lubricating material.

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Claim 10 (Previously presented): The piston pump according to claim 1,

wherein the cylinder comprises a top plenum defined by a top enclosure fixed to the top portion of the cylinder and a motor housing fixed at a position spaced apart by a predetermined distance from the top portion such that the cylinder is connected and fixed to at least a part of the motor housing;

wherein the motor housing is composed of a base portion fixed to the cylinder such that the base portion holds a motor for driving the piston so as to reciprocate inside the cylinder and a cover portion disposed along the base portion such that the cover portion fastens the motor by sandwiching the motor with the base portion; and

wherein the cover portion and the base portion are engaged with a connecting mechanism capable of engagement and disengagement.

Claim 11 (Previously presented): The piston pump according to claim 1, wherein the piston pump is connected to a blood pressure monitor.

Claim 12 (Cancelled)

Claim 13 (Currently Amended): A method of producing a piston pump including a cylindrical cylinder, a piston reciprocating inside the cylinder; a suction port through which gas sucked into a

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pump chamber defined by the cylinder and the piston passes and an exhaust port through which the gas discharged from the pump chamber passes; the method comprising the steps of:

producing a piston pump pre-assembly comprising the cylinder and a cylinder top portion in which the exhaust port is formed;

conducting a leakage inspection of the piston pump pre-assembly by pressurization;

and

producing a piston pump by further assembling components to the piston pump pre-assembly.

Claim 14 (Cancelled):

Claim 15 (New): A piston pump for a blood pressure measuring device comprising:

a cylindrical cylinder having a cylinder head;

a piston reciprocating inside the cylinder;

a suction port through which gas sucked into a pump chamber defined by the cylinder and the piston passes;

an exhaust port through which the gas discharged from the pump chamber passes; and

a coupling member engaging the piston in such a manner that the coupling member is capable of turning in a circumferential direction thereof;

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wherein the piston pump sucks the gas through the suction port and discharges the gas through the exhaust port as the volume of the pump chamber is changed by reciprocating motion of the piston;

wherein the suction port is arranged at a top of the piston with a suction valve, which opens as the volume of the pump chamber is increased;

wherein the exhaust port is arranged at a top of the cylinder with an exhaust valve, which opens when the volume of the pump chamber is decreases; and

wherein the coupling member is ring-shaped and connected to a connecting member driven such that the engaged piston is reciprocated inside the cylinder.

Claim 16 (New): The piston pump according to claim 15, wherein the suction valve is arranged at a top face of the piston inside the pump chamber.

Claim 17 (New): The piston pump according to claim 15, wherein the exhaust valve is umbrella-shaped and arranged at a top face of the top of the cylinder outside the pump chamber.

Claim 18 (New): The piston pump according to claim 15,

wherein the piston has an opening communicating with the suction port,

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wherein the opening is arranged outside the pump chamber so as to allow air sucked through the suction port into the pump chamber to pass and a plenum capable of storing the air to communicate with the opening;

wherein the plenum is encompassed by an enclosure having at least one plenum suction port; and

wherein the enclosure is in a housing having a base portion fixed to the cylinder such that the base portion holds a motor.